Formation and Evolution of Galaxy Outskirts
Proceedings IAU Symposium No. 321, 2016
A. Gil de Paz, J.H. Knapen & J.C. Lee, eds.

doi:10.1017/S1743921316008942

Resolved stellar populations in dSphs. What can they tell us about galaxy evolution?

Andréz del Pino[1,*], Ewa L. Łokas[1], Sebasian L. Hidalgo[2,3] and Sylvain Fouquet[1].

[1]Nicolaus Copernicus Astronomical Centre of the Polish Academy of Sciences,
ul. Bartycka 18 00-716, Warsaw, Poland
[*]email: adpm@camk.edu.pl
[2]Instituto de Astrofísica de Canarias,
Calle Vía Láctea s/n. E38200 - La Laguna, Tenerife, Canary Islands, Spain.
[3]University of La Laguna,
Avda. Astrofísico Fco. Sánchez, s/n. E38206, La Laguna, Tenerife, Canary Islands, Spain.

Abstract. We present a comprehensive photometric study of the Fornax and the Andromeda II dwarf spheroidal (dSph) galaxies. It is based on the up-to-date deepest photometric data for both galaxies. We have derived their detailed star formation histories (SFHs) as a function of galactocentric radius. This allowed us to analyze in detail the spatial distribution of their different stellar populations.

Keywords. galaxies: dwarf, galaxies: evolution, Local Group

The strong asymmetries, stellar clumps, and shell-like structures found in the young ($\leqslant 3$ Gyr) stellar populations of Fornax, together with observed radial gradients in the SFH suggest a major interaction with another system at $z \sim 1$ (del Pino *et al.* 2013, del Pino *et al.* 2015). This event would have enhanced the star formation in the galaxy centre ~ 8 Gyr ago. The gas expelled during this strong star formation event would have remained bound to the remnant galaxy, and been accreted once the system became stable again. This would explain the aforementioned stellar substructures composed of relatively metal rich stars ($[Fe/H] \sim -0.7$).

Andromeda II, on the other hand, shows two distinct populations, differentiated both spatially and by age, and an overdensity of young-intermediate aged stars located at the centre (del Pino *et al.* in prep.). This, together with its anomalous prolate rotation (Ho *et al.* 2012), led us to propose a gas-rich major merger between two dwarf galaxies as a possible scenario for the origin of the galaxy (Łokas *et al.* 2014, Fouquet *et al.* in prep.). The merger process would have triggered the star formation in the centre of the potential well, while the conservation of the angular momentum of both galaxies would have produced the observed prolate rotation.

References

del Pino, A., *et al.* 2013, *MNRAS*, 413, 1505
del Pino, A., Aparicio, A., & Hidalgo, S. L. 2015, *MNRAS*, 454, 3996
del Pino, A., *et al.* 2016, in prep.
Fouquet, S., *et al.* 2016, in prep.
Ho, N., *et al.* 2012, *ApJ*, 758, 124
Łokas, E. L., Ebrová, I., del Pino, A., & Semczuk, M. 2014, *MNRAS*, 445, 6